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The Impact of CEO Compensation on Firm Performance in the Oil Industry

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ABSTRACT

Critics often cite poor executive compensation schemes as one of the leading causes of the recent credit crisis. This paper investigates whether compensation structures at the end of the 2006 fiscal year created incentives for Chief Executive Officers (CEOs) in the oil industry to take on excessive risk, which subsequently may have lead to weaker firm performance during the crisis. I find no evidence to support the argument that higher pay sensitivity through option and other incentive awards lead to worse firm performance. In fact, results do not provide any evidence that company performance during the crisis was related to CEO incentives.

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I. INTRODUCTION

One of the key questions that has risen out of the recent credit crisis is whether Chief Executive Officers (CEOs) are properly incentivized. More specifically, many have asked how CEO compensation structures affect the way they run their respective companies, and how their pay influences their decision making processes. Are CEOs incentivized to take on excessive risk? If so, how can one regulate their risk-seeking behavior, and where does one draw the line between acceptable and excessive risk? These, alongside many other questions concerning executive pay structures, are at the center of a massive and complex ongoing debate.

The debate on executive compensation dates back to many years before the recent recession (Houston, 1995; Jensen & Murphy, 1990), but the crisis has served as a major spark to further explore the topic and attempt to address unresolved problems. Many argue that poor executive compensation structure was one of the leading causes in bringing about the credit crisis. Critics state that CEOs were incentivized to place high value bets which appeared profitable pre-crisis, but turned a blind eye to the risks that were associated with their gambles in the long run. Evidently, as the credit bubble collapsed, their bets turned out to be disastrous. In order to avoid a second iteration of the credit crisis, the Obama administration has investigated possible solutions to help regulate this phenomenon. The government's stated goal is "to more closely align pay

with long-term performance" [1] and to reinforce shareholder's influence on executives and compensation structures through programs such as "Say on Pay."

Whether these are the right steps toward proper regulation of CEO behavior remains unclear. A prominent counter-argument states that aligning executive incentives with shareholder interests may actually lead to excessive risk seeking behavior. In the event that CEO compensation structure is mainly determined by shareholders, the latter may incentivize the executives as they deem appropriate. Furthermore, there exists an agency conflict between shareholders and debtholders. Whereas shareholders fully benefit from the gains, which have no upward limits, they only share a part the losses, which are limited to the equity they contributed (Bebchuk & Spamann, 2009). As such, shareholders may not have the best interest of the company in mind, and may incentivize the CEOs to take on excessive risk.

To shed light on this debate, Fahlenbrach and Stulz (2009) wrote a key paper examining bank CEO incentives at the end of fiscal year 2006 and subsequent firm performance throughout the financial crisis. The paper finds no evidence that banks with CEOs whose incentives were more closely aligned with shareholder interests performed better throughout the crisis. To the contrary, the authors find some evidence that companies with more closely aligned shareholder interests and CEO incentives performed worse throughout the crisis. The findings of this paper, alongside extensive literature with supportive arguments and results, lead one to question whether pre-recession pay structures and current pay structures (which have changed surprisingly

[1] Fahlenbrach & Stulz (2009)

little[2]) are designed to incentivize CEOs to act in a company's best interest. As Fahlenbrach and Stulz's paper suggests, this may not be the case in the banking sector, which raises skepticism to the actions and plans of the government.

A great amount of research concerning the recent financial crisis has focused specifically on the finance sector and left other industries unexplored. This paper will contribute to existing literature by investigating the extent to which the findings of Fahlenbrach and Stulz's research hold true in other fields, specifically by replicating the study for CEOs within the U.S. oil industry. The oil industry was chosen because it is one of the key sectors in the economy. It has a high political and environmental impact within the United States and is characterized as a less cyclical market due to a rather inelastic demand for oil and gas. Furthermore, there is a lot of variation in firm performance for the oil industry throughout the financial crisis. There is also a lot of variation in compensation size. Finally, there is little product differentiation, which may suggest that performance differentiation is mostly a result of management. The combination of all of the above elements makes the oil industry a good basis for comparison to the banking sector.

In order to investigate the impact of CEO pay on firm performance in the oil industry during the credit crisis, this study will use empirical data from ExecuComp to run regressions of CEO incentives on company performance. The regressions will also take into account control variables such as firm size and previous stock returns, which may have influenced firm performance throughout the credit crisis. I hypothesize that

[2] See Aol Daily Finance – http://www.dailyfinance.com/story/credit/andrew-ross-sorkin-lehman-too-big-to-fail/19629341/

when pay sensitivity increases, the alignment between CEO incentives and shareholder interests tightens, and the payoff asymmetries faced by CEOs are accentuated. This may have lead CEOs to take excessive risk and resulted in weaker company performance during the crisis.

The remainder of the paper proceeds as follows. In section II, I review existing literature on executive compensation. Section III introduces the sample of firms, data sources and summary statistics and defines all of the explanatory and dependent variables. In section IV, I analyze the relationship between CEO incentives and subsequent firm performance. I conclude in section V.

II. LITERATURE REVIEW

Many people argue that poor executive compensation plans were one of the key elements that contributed to bringing about the recession. Despite extensive literature on remuneration, there still remain many unanswered questions, including how to best incentivize executives. Some argue that it is through higher pay sensitivity, which is created by awarding bonuses, stock awards, and options to executives. In theory, higher pay sensitivity would create greater incentives for CEOs to do what is best for their company, because the CEO's wealth is more closely tied to changes in company performance. In other words, the better the company performs, the higher the value of the CEO's wealth gets. On the other hand, this type of remuneration creates a payoff asymmetry as CEOs face unlimited gains but limited losses (this is further explained

below). This phenomenon may lead executives to take on excessive risk as their compensation sensitivity increases (Bebchuk & Spamann, 2009).

Scholars also debate who should be responsible for setting these incentives: should shareholders have more influence in setting compensation structures, or should the government regulate them? As stated previously, some economists state that shareholders may incentivize CEOs to take on excessive risk (Cheng, Hong, & Scheinkmann, 2009), which implies that shareholders should have *less* influence on executive compensation. Others argue that closer alignment of shareholder interests and CEO compensation drives firm success, and shareholders should therefore have *more* control on executive compensation. In fact, many activist investors attempt to reinforce shareholder interest and executive incentive alignment in portfolio companies.

Fahlenbrach and Stulz (2009) investigate the impact of CEO incentives (as set through compensation plans) on company performance throughout the recent credit crisis. They find evidence that closer alignment of CEO incentives with shareholders interests actually lead to worse performance throughout the crisis. These findings may seem surprising, but there exist logical theories that help explain these results. Fahlenbrach and Stulz suggest that CEOs with more tightly aligned incentives took risks that other CEOs did not. These risks were taken because the executives were incentivized by their compensation structure to take them. Pre-crisis, these risks looked very profitable for the CEOs and shareholders. As it turns out, the risks lead to disastrous consequences that no one, including the CEOs that took these risks, really saw coming. The fact that CEOs did not sell their shares and also suffered enormous losses during the downturn further strengthens this argument. If consistent, the results of the paper would lead one to

question the government's current actions in implementing programs like say-on-pay, which aim to reinforce shareholder influence on executive compensation in order to better align executive incentives with shareholder interests.

Beltratti and Stulz (2009) find supportive evidence to Fahlenbrach and Stulz's findings. They find that the banks with the highest returns before the crisis performed the worst throughout the crisis. They suggest that banks which were highly valued before the crisis took excessive risk that looked profitable, but which lead to unexpected poor consequences throughout the crisis. They also find a negative correlation between banks that have more shareholder-friendly boards and performance. Better performance, on the other hand, was correlated with banks that had "more restrictions on their activities, stronger oversight of bank capital, and a more independent supervisory authority."[3]

Cheng, Hong, and Scheinkmann (2009) also argue that executive risk-taking behavior is generally caused by incentives which are set by overoptimistic shareholders who buy shares and want to sell as soon as they have made a satisfying profit. Their results "suggest that reforms designed to strengthen the influence of shareholders in compensation decisions may exacerbate short-term risk-taking at the expense of taxpayers by encouraging risk-taking during speculative periods."[4] The issue is that when executives are paid in the form of stock and stock options, their mentality resembles that of stockholders. Stockholders and executives then fully benefit from the gains, but are

[3] Beltratti & Stulz (2009)
[4] Cheng, Hong, & Scheinkmann (2009).

"insulated from the effects of any increase in the level of losses."[5] The core problem, in other words, is one of payoff asymmetry.

Bebchuk and Spamann (2009) illustrate this phenomenon. The process is similar to that of a game of roulette. Let us assume a person has the ability to gamble a large portion of his or her wealth in a game of roulette with symmetric payoffs (meaning you either win the equivalent of your bet or lose your bet). If there is an equal chance of winning or losing[6], a rational, risk-averse person is likely not to play[7]. If the payoff of winning, however, is four times higher than the amount of the potential loss (meaning you either quadruple your bet or lose your bet), the individual becomes much more likely to play. This asymmetry in payoffs is precisely what leads executives to take on excessive risk. CEOs' performance based pay (which includes cash bonuses, restricted stock, and stock options) presents them with the opportunity to gain tremendously in wealth while keeping potential losses constant.

Bebchuk, Cohen and Spamann (2009) examined Lehman Brothers' and Bear Stearns' CEOs' cashing in of restricted stock, stock options, and change in overall wealth from other forms of compensation from 2000 to 2008. The study finds that although CEOs endured harsh losses throughout the financial crisis, they were awarded such large amount of performance based compensation from 2000 to 2008 that their payoff for the period is still significantly positive. The authors suggest that the long-term compensation did in fact *not* incentivize executives to act in the company's best interest in the long-run,

[5] Bebchuk & Spamann (2009).
[6] In reality, the odds of a roulette game are always against the player. The presence of a zero and a double zero slot in most American casinos yield a chance of winning by betting on red or black of only 18/38, which is less than one half.
[7] Assuming the player does not gain any utility from the act of gambling in itself.

despite its nature to do so. The authors explain that instead, the structure of CEOs' compensation plans provided them with many opportunities to attain large amounts of wealth by exploiting short-term gains. Furthermore, the CEOs were able to capitalize on the gains and retain much of their accumulated wealth despite the fact that their respective companies were severely hurt during the credit crisis. The authors state that "such a design provides executives with incentives to seek improvements in short–term results even at the cost of maintaining an excessively high risk of an implosion at some point down the road."[8] In essence, executives already possessed such large amount of vested stock and exercisable options from previous years, that they did in fact focus on short-term results to maximize the amount of money they could extract from the cashing-in process. Of course, the other side of the argument states that the high compensation is necessary to attract and retain top talent[9].

But the issues may be even more complex than that. In an interview on Lehman Brothers, Andrew Sorkin, the author of "Too Big to Fail," suggests that the losses CEOs and other executives incurred were not solely related to money matters. By the time they have become CEOs, executives have already made enormous amounts of money, and "stock options are just the cherry on top of their life."[10] Rather, the incurred losses were due to CEOs' pride. Similar to the companies, many CEOs considered themselves as too big to fail. Sorkin then concludes by asking, almost ironically, "How do you regulate pride?"[11]

[8] Bebchuk, Cohen & Spamann (2009)
[9] See http://www.money-rates.com/blog/2009/09/as-bank-rates-fall-executive-compensation-rises.htm
[10] Andrew Sorkin, "Too Big to Fail"
[11] Andrew Sorkin, "Too Big to Fail"

The problems are clear; unfortunately, the solutions are not. Vicki Elliott, head of rewards consulting in the financial services industry at Mercer LLC, states that setting the proper type of compensation structure cannot "be a cookie cutter approach, the same approach for every firm, but it needs to be thoughtful and reflect the risk taking appetite for each firm."[12] There certainly is no absolute right answer, but many papers have tried to slowly chip away at the problem to find possible solutions that could help avoid another event similar to the credit crisis. Bebchuk and Spamann (2009) suggest tying executive compensation with a broader range of securities, such as a mix of stock, preferred stock and debt. This may help incentivize executives to make better decisions for the company as a whole. Additionally, it may help to set compensation hurdles on broader accounting measures, rather than focusing solely on shareholder beneficial measures like Earnings Per Share (EPS). Finally, if executives do take excessive risk, the bank should have an extra cushion of capital in the event of worse case scenarios.

Bebchuk and Fried (2009) compose an appendix aimed to solve the very same problem. The appendix highlights that executives could be prevented from "gaming" with their compensation components by setting time based restrictions (restricted stock and options cannot be cashed in as soon as they vest) and aggregate limitations (say, for example, no more than 10% of aggregate shares may be unwinded each year). Furthermore, they suggest that the unwinding of options should be a gradual process. The timing of grants should be set at specific dates and not up to the committee's discretion. They also recommend that executives must announce when they plan to sell shares in advance, or, equity incentives could be unwinded on a predetermined schedule set at the

[12] See http://www.nytimes.com/2010/07/08/business/global/08bonus.html

time of the grant. In summary, executives should be prevented from any type of hedging or strategy that would help cut down on their losses in the case of poor performance.

As stated above, the debate on executive compensation is long and complex, and sometimes even contradictory. The problems and possible solutions highlighted above represent only a fraction of the ongoing discussion. The aim of this review, however, is to build a brief summary of the existing problems and possible solutions.

III. ECONOMETRIC METHODOLOGY AND DATA

This paper investigates how executive compensation pay components throughout the 2006 fiscal year incentivized CEOs in the oil industry to act by examining firm performance throughout the financial crisis. In order to evaluate the extent of these relationships, this paper will regress variables for "Cash bonus / Salary," "Dollar gain from +1%," "Ownership %," "Equity Risk (%)," along with control variables for the SIC code, the stock return in 2006, the Book-to-Market value at the end of 2006, and the total market value of the company at the end of 2006, on two separate variables reflecting firm performance. The first set of regressions will measure the impact of the independent variables on stock returns. The second set of regressions will measure the impact of the independent variables on Return On Assets (ROA). This methodology lets one examine the impact of the explanatory variables on both a financial measure of performance as well as an accounting measure of performance.

3.1 Sample

The starting point for the sample base is obtained by researching all of the possible SIC codes that are related to the oil industry. This includes all SIC codes beginning with 13 (1311, 1321, 1382, 1389), 29 (2911, 2992, 2999), and 461 (4612, 4613, 4619). This grossly encompasses "oil and gas extraction" (13), "petroleum refining and related industries" (29), and "pipelines, except natural gas" (46).

3.2 CEO Incentives

The data on executive compensation at the end of fiscal year 2006 is downloaded from ExecuComp, which can be accessed through the Wharton Research Data Services. This narrows down the initial sample to SIC codes 1311, 1381, 1382, 1389, 2911, and 2990 and encompasses 67 companies, including all of the major players (Chevron, ConocoPhillips, Exxon Mobil, etc.).

Table 1 illustrates some of the key summary statistics. The mean total compensation (which includes salary as well as short-term and long-term incentive plans) for CEOs in our sample is $8,458,900, with a median of $5,026,600. This median is significantly higher than the one observed in the banking sector[13], where the total compensation median lies at $2,453,500. However, the means are relatively close, implying that the banking sector has important outliers for total compensation which skew the mean upwards.

The mean salary for CEOs in our sample is $792,300, with a median of $667,100. These values are close to the mean and median salary for the bank CEOs. One can also

[13] The "banking sector" refers to the sample of firms analyzed by Fahlenbrach & Stulz (2009).

infer that a great portion of executive compensation springs from performance-based pay, as mean salary only accounts for approximately 10.5% of total compensation.

The sample cash bonus to salary ratio for CEOs has a mean value of 1.5, with a median of 0.4. The banking sector, on the other hand, is characterized by higher bonus ratios, with a mean ratio of 2.8 and median of 0.9. As discussed previously, one of the core problems in executive compensation is that of payoff asymmetry. Cash bonuses embody this problem as they enable the possibility of high gains versus limited losses for CEOs in the short run. CEOs are thereby incentivized to take excessive risk. In the case of success, they earn high bonuses. In the event of failure, the CEOs do not have to pay additional costs to cover the losses the company may incur. The cash bonus to salary ratio will therefore be included in the regressions. I hypothesize that the coefficient on the cash bonus to salary ratio will be negative, because a higher ratio would incentivize the executives to take excessive risk which would lead to worse performance throughout the crisis.

It is also important to measure the sensitivity of a CEO's equity portfolio to changes in stock price and stock volatility. In theory, the higher the sensitivity, the more the CEO will benefit from positive firm performance. This suggests that higher pay sensitivity would create higher incentives for CEOs to drive their company's success. As discussed previously, however, this may not always be the case due to payoff asymmetry.

The first sensitivity measure is "dollar gain from 1%." This variable measures the increase in the value of a CEO's total equity portfolio for a 1% increase in stock price. To get this measure, one must break the value of the equity portfolio into three components:

shares already vested owned by the CEO, Restricted Stock Units (RSUs), and total options held at the end of the 2006 fiscal year. The dollar gain for vested shares is straightforward. I multiply shares owned (options excluded) from ExecuComp by the current respective stock price from CRSP to obtain the value of vested equity. I then multiply this value by .01, seeing that a 1% increase in stock price would result in a $.01 increase in value of vested shares. For the RSUs, I use the dollar value of "Restricted Stock Holdings" from ExecuComp and multiply the values by .01. In order to capture the dollar gain from options, one first needs to calculate the Delta of the options. To calculate the Delta, one needs the options' expiration date, exercise price, dividend yield, current stock price, volatility, and the risk free rate. The option expiration date and exercise price are downloaded from ExecuComp. The dividend yield is calculated by dividing the percent change in stock price over the 2006 fiscal year by the total dividends paid over the year, which are found on Yahoo Finance. The risk free rate is defined as the ten-year Treasury rate on December 29, 2006, which is available on Bloomberg. The volatility is calculated by annualizing the standard deviation of three-year lagged daily stock returns. I then calculate a weighted average of the Deltas, as well as a weighted average of the Black Scholes Value of the options held by each CEO, and compute the weighted average of the dollar gain from a single option. Finally, I multiply this number by the total number of options held. I then add the dollar gain from vested shares, RSUs, and options for a 1% increase in stock price to obtain the "dollar gain from 1%."

The "dollar gain from 1%" is measured in thousands of dollars for comparison purposes. I hypothesize that due to payoff asymmetry, the higher the "dollar gain from 1%," the more likely it is that the CEO took on excessive risk on behalf of the company.

If the hypothesis holds true, one would expect a negative coefficient on this explanatory variable as higher risks would likely have resulted in lower performance throughout the crisis.

The sensitivity of the equity portfolio to risk is estimated by taking a weighted average of the Vega for each CEO option. By definition, the Vega of an option measures the change in the value of an option for a 1% increase in volatility. To calculate the Vega of the options, I also use the options' expiration date, exercise price, dividend yield, current stock price, volatility, and the risk free rate. I hypothesize that as a CEO's option Vega increases, the more likely a CEO will be to take excessive risk. This is due to the nature of options, which exacerbate the payoff asymmetry problem. One would therefore expect a negative coefficient on this explanatory variable as well.

The last independent variable measuring sensitivity is the ownership percent. The ownership percent is calculated by dividing the amount of shares owned (options excluded) by the "common shares used to calculated earnings per share" value from ExecuComp. To stay consistent with the comparison study, I also apply a natural log function to the ownership variable in order to reduce the weight of outliers and to obtain a tighter distribution. In terms of equity, CEOs in the oil industry own a mean value of shares worth $139,995,700, although this value is skewed by major outliers (maximum shares held are worth $3,439,136,300 by Bruce A. Williamson, who owns approximately 20% of Dynegy, Inc.). The median value of shares held by CEOs in the sample is $18,279,000, which is slightly lower than the median value for bank CEOs. The mean (median) value of ownership from shares is equivalent to 1.53% (0.43%) of outstanding shares. This tells us that the average (median) CEO's wealth increases by $15.30 ($4.30)

for every $1,000 of additional shareholder wealth created. One can observe that as the ownership percent increases, the more the CEO benefits from an increase in shareholder wealth created. I therefore hypothesize that if payoff asymmetry holds true, then one would also expect the coefficient on ownership to be negative.

3.3 Control Variables

The control variables include several indicator variables for each different SIC code contained in the final sample, to take into account differences that are related to the sub-industry rather than to management behavior. I choose the SIC code 2911 as the omitted indicator variable due to the fact that the most important players in the industry are included in the 2911 subsample.

The next control variable is the company's stock return in 2006. In general, it is plausible that a firm's future performance may be affected by current stock returns. For example, a firm may perform better following a period of high returns than following a period of low returns. Or, it could be the case that firms which performed better during 2006 performed worse throughout the credit crisis because they have higher sensitivity to market conditions: when the economy is booming, they perform particularly well; when the economy is in a recession, they perform particular poorly. The stock prices were downloaded from the CRSP dataset, available through the Wharton Research Data Services.

Table 2 of the appendix presents summary statistics on stock prices. For the fiscal year 2006, the sample mean (median) change in stock price is 10.5% (7.3%). The biggest decrease in stock price was experienced by Headwaters, Inc., falling by 32.4% over the

year. During the crisis, Headwaters, Inc.'s price fell by an additional 60%. The maximum increase in stock price in 2006 was experienced by Holly Corp., with a rise of 75.7%. During the crisis, Holly Corp saw a decrease in stock price by 75.4%. The biggest decrease in stock price during the downturn was experienced by Tetra Technologies Inc., with a drop in stock price by 83%. The firm that performed best on a stock price basis during the recession was Comstock Resources Inc., with an increase in stock price of 56.7%, but it is one of the only two firms in the entire sample that experienced positive returns during that period. In fact, the bottom 75% of the firms had stock returns below -31%.

The regressions also include control variables for the book-to-market ratio and market value. The book-to-market ratio is equal to the book value of the firm divided by the market value of the firm. If the ratio is above 1, the stock is considered to be undervalued. If it is below 1, the stock is likely overvalued. Both the book-to-market ratio and the market value of the firm are known to have an impact on returns.

3.4 Dependent Variables

As mentioned previously, this study uses two different dependent variables to estimate firm performance from both a financial (stock returns) and an accounting (ROA) standpoint. The first variable I consider is stock returns from July 2, 2007 to December 31, 2008, which many identify as starting and end points to the credit crisis[14]. I use the buy-and-hold approach to calculate returns for the period. This approach calculates the return for an investor who buys one company share at the beginning of the period, holds

[14] These are also the starting and end points of the period chosen by Fahlenbrach & Stulz (2009)

the share throughout the period, and sells the share for its current price at the end of the period. In essence, it reflects the stock price appreciation or depreciation over a certain period, a key indicator of firm performance.

The second dependent variable is Return on Assets (ROA). To stay consistent with Fahlenbrach and Stulz's study, I define ROA as the cumulative quarterly net income from the third quarter of the 2007 fiscal year to the third quarter of the 2008 fiscal year divided by the total assets at the end of the second quarter of the 2007 fiscal year. The regressions on ROA also include a control variable for lagged ROA, which measures the return on assets over the five previous periods. The data on quarterly net income and quarterly total assets is downloaded from Compustat.

IV. RESULTS

Columns (1)-(6) of **Table 3** illustrate the impact of executive pay incentives on buy-and-hold returns. The first regression measures the impact of the bonus incentive, which has a negative coefficient but no statistical significance. In the second regression, "dollar gain from 1%" has a positive coefficient but no statistical significance either. In regressions (3) and (4) respectively, I find a negative coefficient on the variable for percent ownership and a positive coefficient on equity risk, neither of which is statistically significant.

Our results improve when adding in further control variables. Even though the coefficients on incentive components remain statistically insignificant, the regressions

show positive correlation between total market value and stock performance that is statistically significant at the one percent level. When I omit the variable for percent ownership (column 5), the coefficient on market value is statistically significant and indicates that on average, a one percent increase in total market value leads to a .0982 percentage point increase in buy-and-hold returns. Additionally, the book-to-market value of the firm is significant at the one percent level and has a negative coefficient. The coefficient indicates that as the book-to-market value decreases by .1, buy-and-hold returns increase by an average of .0377 percentage points. This result suggests that companies with higher book-to-market ratios pre-crisis took more risks that worked out poorly during the crisis. The indicator variables for SIC code 1311 and SIC code 2990 are statistically significant at the one percent level. Both are also positive, indicating that the firms in those subsamples on average performed better throughout the credit crisis than firms in the 2911 SIC code subsample. Finally, the coefficient on the cash bonus to salary ratio is negative and statistically significant, although this result is not robust in other regressions. Overall, the variables explain 56.3% of the variation in stock prices throughout the financial crisis. When omitting both "dollar gain from 1%" and percent ownership (column 6), the incentive and sensitivity variables are still insignificant. The market value, book-to-market, and SIC codes 1311 and 2990 remain statistically significant.

The above results suggest that CEO incentives and portfolio sensitivity explain little of the variation in firm performance as measured by buy-and-hold returns throughout the credit crisis. As discussed earlier, some scholars argue that compensation components aimed to closely align shareholder interests with CEO incentives improve

company performance. Others argue that tighter alignment hurts company performance. In any case, one would expect incentive awards to have some effect on company performance. The results are therefore surprising as they suggest that CEO incentives had *no* statistically significant effect on company performance.

It is important to think about how a regulator would interpret this. The short-term and long-term incentive awards are meant to drive a CEO to do what is best for their respective company. Whether these incentives succeed or fail to do so would have an important meaning to the regulator. The regulator would be able to identify the characteristics of the efficient incentives as well as flaws of the deficient ones and extrapolate this information to improve compensation structures overall. In this study, however, incentives fail to have *any* impact on company performance. This strange result may be due to the fact that the sample size is simply too small. Consequently, there may not be enough evidence to reject the null hypothesis[15].

I do find that the market value, along with indicator variables for the SIC codes, explain up to 30% of the variation. A possible explanation of this result may be linked to the fact that the oil industry is dominated by major players who lead the market and have a great influence on the price of oil. This gives the big firms a strategic advantage unavailable to smaller and less important firms. In other words, when oil prices decrease or the economy experiences a downturn, the oil industry as a whole is hurt, but bigger firms are less hurt than smaller firms on a relative basis. As a result, major players may

[15] Ho: tighter alignment of shareholder interests and CEO incentives has no impact on company performance.
Ha: tighter alignment of shareholder interests and CEO incentives has a negative impact on company performance.

have performed better than smaller players during the credit crisis. This phenomenon, however, is likely to be taken into account for in the valuation of the company's stock price to begin with. Another possible explanation is related to the condition of the markets during the credit crisis. During the recession, the markets for financing completely dried up and almost shut down. This made it difficult for big firms to obtain additional financing, and almost impossible for smaller firms, despite the high necessity to do so. Large firms consequently faced fewer difficulties than smaller firms to receive loans and were able to perform better throughout the crisis.

I also investigate whether these results hold true when measuring performance throughout the credit crisis from an accounting stand point by using ROA as the dependent variable. The results are presented in **Table 4**.

In the first column, lagged ROA has a negative coefficient and it statistically significant. An increase in lagged ROA by one percentage point, on average, results in a .68 percentage point decrease in return on assets during the credit crisis. On the flip side, a one percentage point decrease in lagged ROA leads to an average increase in return on assets by .68 percentage points during the credit crisis. This is a surprising result and is due to the fact that most firms actually saw an increase in ROA during the period chosen as representative of the credit crisis. The subsample of firms for the SIC code 2911, for example, have a mean lagged ROA of -.65% compared to a mean ROA of 1.46% during the observed period. This rise in ROA is attributed to a rise in cumulative quarterly net income from 2007Q3 to 2008Q3 compared to equivalent previous periods while total assets stay relatively constant. As further explained below, this may be due to the fact that companies in the oil industry were most heavily affected by the credit crisis at a later

point in time than those in the banking sector. For the sake of comparison, however, I keep the period equivalent. The indicator variable for SIC code 1311 is also significant and positive, indicating that companies classified under an SIC code of 1311 experienced higher returns on assets during the crisis. The combination of lagged ROA and indicator variables for SIC codes explain approximately 40% of the variation in ROA during the credit crisis.

In column two, I eliminate the indicator variables for SIC codes and include all other explanatory and control variables with the exception of "dollar gain from 1%." The coefficient on lagged ROA remains statistically significant and negative. The coefficient on the cash bonus to salary ratio and equity risk are negative, which supports the view that CEOs were incentivized to take excessive risk; however, the variables are not statistically significant. The ownership percent coefficient is positive but is also not statistically significant.

In the third column, the regressions additionally omit the variable for equity risk and include "dollar gain from 1%." The coefficient on lagged ROA is still positive and remains the only statistically significant variable. The coefficient on "dollar gain from 1%" is negative, which supports the original hypothesis, but it is not statistically significant.

Column four measures the impact of all variables with the exception of equity risk on Return on Assets, which explain 56.8% of the variation in ROA during the credit crisis. The coefficient of cash bonus to salary ratio has a negative coefficient that is statistically significant. This tells us that on average, firms with higher cash bonus to

salary ratios at the end of the fiscal year 2006 experienced lower returns on assets during the crisis. This result gives some supportive evidence to the argument that a higher cash bonus to salary ratio may incentivize executives to take on excessive risk. However, the significance is not robust to other regressions. The coefficient on stock returns in FY 2006 and the coefficient on market value are insignificant. The coefficient on CEO incentives ("dollar gain from 1%" and ownership percent) are both positive, although statistically insignificant. The coefficient for lagged ROA is still negative and statistically significant. The book-to-market coefficient is also negative and statistically significant, which reinforces the previous argument that companies with higher book-to-market ratios may have taken on more risks pre-crisis that turned out poorly during the crisis. Finally, the indicator variable for SIC code 1311 remains positive and statistically significant.

The fact that the explanatory variables representative of CEO incentives are mostly insignificant indicates that incentives at the end of the 2006 fiscal year had very little impact on company performance from an accounting standpoint during the credit crisis. As argued previously, this result is surprising. The results suggest that lagged ROA, rather than CEO incentives, was the main determinant of ROA during the credit crisis. These findings may be influenced by the chosen period, however, seeing that the oil industry experienced higher returns on assets during the observed period than in previous periods. This is likely related to the fact that oil prices experienced a dramatic downfall starting only in July of 2008, reaching a trough in January of 2009. To stay consistent with the comparison paper, however, I calculate return on assets as the "cumulative quarterly net income from 2007Q3 to 2008Q3 divided by total assets at the

end of 2007Q2."[16] This measure captures only the beginning of the impact of the recession on oil prices. As a consequence, the regressions do not capture the full effects of the CEO incentives on return on assets during the credit crisis.

V. CONCLUSION

This paper investigates the impact of CEO incentives on company performance during the credit crisis for firms in the oil industry. Many have blamed poor executive compensation structures as one of the leading causes in bringing about the recession. Specifically, critics argue that CEOs were incentivized to take excessive risks which seemed profitable for shareholders, while turning a blind eye to the associated risks in the long run. Alongside this argument, many state that a closer alignment of shareholder interests and CEO incentives may exacerbate this problem.

I find no evidence that tighter alignment of CEO incentives and shareholder interests had a negative impact on company performance during the credit crisis. In fact, I find that CEO incentives had very little impact on company performance during the crisis overall. Rather, company performance was significantly dependent on the market value of the firm at the end of the 2006 fiscal year. These results are likely due to the fact that larger firms had an easier time finding loans for financing than smaller firms due to poor market conditions during the credit crisis. When performance was measured by Return on Assets, CEO incentives had no significant impact on firm performance either.

[16] Fahlenbrach & Stulz (2009)

These results are surprising and have interesting implications for regulators and individuals attempting to design efficient CEO pay schemes in the oil industry. According to this study, compensation structures in the period preceding the credit crisis were designed in a way that had no impact on subsequent performance during the crisis. In other words, tighter alignment of CEO incentives and shareholder interests neither hurt nor helped companies during the recession. This makes for difficult implications from a policymaker's point of view. On one side, there is no evidence that CEO incentives in the oil industry lead to excessive risk seeking behavior. On the other hand, there is also no evidence that CEO incentives efficiently tweaked CEO behavior to drive firm success.

Future research should investigate what other factors may have influenced firm performance in the oil industry during the credit crisis and explore whether the results of this paper hold true in a larger sample base. If the results do hold true, future studies should investigate on how to improve CEO incentives in the oil industry, which seem to control risk-seeking behavior, but fail to drive firm performance.

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VII. APPENDIX

The sample consists of all companies found in Standard and Poor's ExecuComp database in the year 2006 that are considered to be part of the oil industry. This includes all firms with SIC codes between 1311 and 1389, and between 2911 and 2990. Appendix A.1 shows the sample firms originally found in the database.

A.1.

1.	APACHE CORP	35.	HELMERICH & PAYNE
2.	FOREST OIL CORP	36.	PARKER DRILLING CO
3.	RANGE RESOURCES CORP	37.	ROWAN COS INC
4.	NOBLE ENERGY INC	38.	PIONEER DRILLING CO
5.	OCCIDENTAL PETROLEUM CORP	39.	NOBLE CORP
6.	PENN VIRGINIA CORP	40.	PRIDE INTERNATIONAL INC
7.	PETROLEUM DEVELOPMENT CORP	41.	TRANSOCEAN LTD
8.	POGO PRODUCING CO	42.	PATTERSON-UTI ENERGY INC
9.	SWIFT ENERGY CO	43.	DIAMOND OFFSHRE DRILLING INC
10.	UNIT CORP	44.	SEITEL INC
11.	ANADARKO PETROLEUM CORP	45.	HALLIBURTON CO
12.	PIONEER NATURAL RESOURCES CO	46.	OCEANEERING INTERNATIONAL
13.	DEVON ENERGY CORP	47.	SCHLUMBERGER LTD
14.	HARVEST NATURAL RESOURCES	48.	TETRA TECHNOLOGIES INC/DE
15.	EOG RESOURCES INC	49.	BJ SERVICES CO
16.	CABOT OIL & GAS CORP	50.	SUPERIOR ENERGY SERVICES INC
17.	DENBURY RESOURCES INC	51.	HELIX ENERGY SOLUTIONS GROUP
18.	COMSTOCK RESOURCES INC	52.	W-H ENERGY SERVICES INC
19.	DYNEGY INC	53.	SUPERIOR WELL SERVICES INC
20.	PETROQUEST ENERGY INC	54.	HESS CORP
21.	ST MARY LAND & EXPLOR CO	55.	CHEVRON CORP
22.	CHESAPEAKE ENERGY CORP	56.	EXXON MOBIL CORP
23.	XTO ENERGY INC	57.	HOLLY CORP
24.	STONE ENERGY CORP	58.	MARATHON OIL CORP
25.	NEWFIELD EXPLORATION CO	59.	MURPHY OIL CORP
26.	PETROHAWK ENERGY CORP	60.	CONOCOPHILLIPS
27.	ENCORE ACQUISITION CO	61.	SUNOCO INC
28.	MARINER ENERGY INC	62.	TESORO CORP
29.	PLAINS EXPLORATION & PROD CO	63.	FRONTIER OIL CORP
30.	CIMAREX ENERGY CO	64.	VALERO ENERGY CORP
31.	NABORS INDUSTRIES LTD	65.	LUBRIZOL CORP
32.	ATWOOD OCEANICS	66.	QUAKER CHEMICAL CORP
33.	ENSCO PLC -ADR	67.	HEADWATERS INC
34.	GLOBALSANTAFE CORP		

Table 1

Executive compensation summary statistics for sample CEOs at the end of fiscal year 2006

This table present summary statistics for 67 firms defined as being part of the overall oil industry for fiscal year 2006. The data stems from the Compustat ExecuComp database, which can be accessed through the Wharton Research Data Services. The values are reported in thousands of US dollars, with the exception of ratios and percentage values. Most variables can be found directly in ExecuComp. The first column represents the mean of selected CEO compensation components. The second column represents the median of the pay components. “Cash Bonus” is defined by Fahlenbrach & Stulz (2009) as the sum of bonus and non-equity incentive plan compensation. Percentage ownership is defined as shares owned dived by total common shares outstanding.

	CEO	
	Mean	Median
Annual compensation		
Total compensation	8,458.9	5,026.6
Salary	792.3	667.1
"Cash bonus"	2,430.2	1,100.0
Dollar value of annual stock grant	3,073.7	1,449.7
Dollar value of annual option grant	2,229.3	698.6
Other compensation	230.7	67.2
Cash bonus / salary	1.5	0.4
Equity bonus	3,073.7	1,449.7
Value of shares	139,995.7	18,279.5
Value of exercisable options (Black-Scholes)	21,013.1	6,146.2
Value of unexercisable options (Black-Scholes)	3,669.5	1,383.7
Value of restricted stock holdings	10,188.4	2,708.2
Value of shares / salary	147.1	23.9
Percentage ownership	1.5%	0.4%

Table 2

Summary Statistics for movement in stock price and effect on CEO wealth

This table shows the major trends in stock prices for sample firms. The number in parentheses represents the number of firms in the sample for each of the measures. Criteria for exclusion include: if a CEO left the firm before September 2007; if the firm stock price is no longer available (due to merger, acquisition, bankruptcy, or other); or if the data from Compustat is incomplete. Total value of shares held is defined as shares owned (options excluded) by the CEO times current stock price. Loss for constant shares is defined as the total value of shares held at the end of the 2006 fiscal year times the change in stock price over the sample period. It measures how much CEOs would have lost due to changes in stock price, assuming the number of shares held stayed constant over the time period. The stock prices are measured in dollars. The total value of shares held and loss for constant shares are reported in thousands of dollars.

	Mean	Minimum	Q1	Median	Q3	Maximum
Stock price end of fiscal year 2006 (60)	$38.2	$8.2	$27.9	$36.2	$47.9	$80.9
Stock price end of sample period (60)	$27.0	$2.9	$14.4	$21.2	$38.9	$76.5
% Change in stock price for fiscal year 2006 (60)	10.5%	-32.4%	-7.9%	7.3%	24.6%	75.7%
% Change in Stock Price during credit crisis (60)	-44.6%	-83.1%	-60.9%	-52.4%	-31.1%	56.8%
Total value of shares held end of fiscal year 2006 (57)	$145,852.1	$302.4	$6,242.5	$16,445.9	$45,272.9	$3,439,136.3
Loss for constant shares (57)	-$56,062.4	-$2,489,098.7	-$16,439.8	-$3,818.2	-$700.4	$168,062.3

Table 3

Buy-and-hold returns as a function of CEO annual cash bonus ratio, ownership incentives and equity risk

VARIABLES	(1) Returns	(2) Returns	(3) Returns	(4) Returns	(5) Returns	(6) Returns
"Cash bonus" / salary	-0.000117				-0.0103*	-0.00805
	(0.00703)				(0.00552)	(0.00482)
Dollar gain from 1 %		0.000548			0.000617	
		(-0.00076)			(0.000723)	
Ownership (%)			-0.0310			
			(0.0222)			
Equity risk (%)				0.00451	0.00378	0.00338
				(0.00363)	(0.00301)	(0.00297)
Stock return in 2006					-0.108	-0.0861
					(0.126)	(0.122)
Log (Market Value)					0.0982***	0.103***
					(0.0188)	(0.0179)
Book-to-Market					-0.377*	-0.320*
					(0.188)	(0.175)
SIC code 1311	0.0582	0.0242	0.0868	0.0137	0.231***	0.215***
	(0.0902)	(0.0804)	(0.0928)	(0.0759)	(0.0730)	(0.0704)
SIC code 1381	-0.127	-0.121	-0.159	-0.121	-0.0189	-0.0226
	(0.106)	(0.0976)	(0.118)	(0.0902)	(0.0864)	(0.0860)
SIC code 1389	-0.183	-0.202*	-0.173	-0.197*	-0.140	-0.144
	(0.128)	(0.118)	(0.129)	(0.115)	(0.0945)	(0.0940)
SIC code 2990	-0.00385	0.106	0.110	0.0846	0.438***	0.426***
	(0.164)	(0.168)	(0.196)	(0.162)	(0.139)	(0.138)
Observations	60	53	55	55	52	52
R-squared	0.121	0.141	0.169	0.150	0.563	0.555

Standard Errors in Parentheses

*** significant at the 1% level, ** significant at the 5% level, * significant at the 1% level

Table 4

Return on Assets (ROA) as a function of CEO annual cash bonus ratio, ownership incentives and equity risk

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) ROA
"Cash bonus" / salary		-0.00116	-0.000977	-0.00212*
		(0.00114)	(0.00124)	(0.00105)
Dollar gain from 1 %			-0.0000575	0.000142
			(0.000163)	(0.00014)
Ownership (%)		0.00391	0.00440	0.00257
		(0.00397)	(0.00404)	(0.00338)
Equity risk (%)		-0.0000971		
		(0.000698)		
Lagged ROA	-0.683***	-0.827***	-0.819***	-0.844***
	(0.193)	(0.222)	(0.219)	(0.184)
Stock return in 2006		-0.0280	-0.0246	-0.0295
		(0.0269)	(0.0267)	(0.0232)
Log (Market Value)		0.00378	0.00465	0.00702
		(0.00410)	(0.00468)	(0.00422)
Book-to-Market		-0.0351	-0.0303	-0.101***
		(0.0375)	(0.0389)	(0.0358)
SIC code 1311	0.0344***			0.0538***
	(0.0119)			(0.0138)
SIC code 1381	0.00146			0.00762
	(0.0147)			(0.0174)
SIC code 1389	-0.00657			-0.00818
	(0.0156)			(0.0176)
SIC code 2990	-0.0346			0.0241
	(0.0217)			(0.0264)
Observations	61	50	50	50
R-squared	0.403	0.287	0.288	0.568

Standard Errors in Parentheses

*** significant at the 1% level, ** significant at the 5% level, * significant at the 1% level